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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,179	04/19/2004	Masaya Mitani	WAKAB76.005AUS	2425

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EXAMINER	
ONEILL, KARIE AMBER	
ART UNIT	**PAPER NUMBER**
1745	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jcartee@kmob.com
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Office Action Summary	Application No.	Applicant(s)	
	10/827,179	MITANI ET AL.	
	Examiner	Art Unit	
	Karie O'Neill	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *8-16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The Applicant's amendment filed on May 18, 2007, was received. Claims 4 has been amended. Claims 8-16 have been withdrawn from consideration. Claims 17-18 have been added.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on December 21, 2006.

Specification

3. The spelling correction of --polyglycerol-- in the specification has been approved and the specification objection withdrawn.

Claim Objections

4. The spelling correction of the word --polyglycerol-- in Claim 4 has been corrected and the claim objection has been withdrawn.

Claim Rejections - 35 USC § 103

5. Claims 1-7 an 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamisuki et al. (US 6,899,974 B2) in view of Johnson (US 3,776,779).

With regard to Claim 1, Kamisuki et al. disclose in Figure 3, a secondary battery comprising a cathode (2) containing a proton-conducting compound as an electrode active material, an anode (4) containing a proton-conducting compound as an electrode active material. Each electrode is made of a binder matrix wherein polymers are used

as electrode active materials and are, for example, π-conjugated macromolecules such as polyanaline, polythiophene, polypyrrole, polyacetylene, poly-p-phenylene, polyphylene vinylene, polyperinaphthalene, polyfuran, polythienylene, polypyridinediyl, among others (column 4 lines 25-40). Kamisuki et al. also discloses an aqueous electrolytic solution containing a proton source as an electrolyte, for example, an aqueous solution of protonic acid such as sulfuric acid, hydrochloric acid and phosphoric acid (column 5 lines 16-19).

Kamisuki et al. do not disclose wherein the electrolytic solution comprises a polymeric compound having an atom with an unpaired electron in its principal chain as an electron-transfer promoter.

Johnson discloses a gelled electrolyte solution containing a polyglycol polymer, preferably polyethylene glycol (column 3 line14-15), which has an oxygen atom with an unpaired electron as part of its chemical structure. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a polymeric compound having an atom with an unpaired electron in its principal chain with the electrolytic solution of Kamisuki et al., because Johnson teaches using an additive to stabilize the gel created and in an effort to improve the battery performance or life (column 4 lines 20-24).

With regard to Claims 2-4, Johnson discloses the electron-transfer promoter being a polymeric compound, preferably polyethylene glycol (column 3 lines 14-15), which in the principal chain, has an oxygen as an atom with an unpaired electron, and is a polymeric compound having an alkylene oxide moiety in a repeating unit.

Polyethylene glycol and polyethylene oxide are polymers having an identical structure: $HO-(CH_2-CH_2-O)_n-H$. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a polymeric compound, such as polyethylene glycol, having an atom with an unpaired electron in its principal chain with the electrolytic solution of Kamisuki et al., because Johnson teaches using an additive of such a nature that it will not significantly shrink, crack or otherwise breakdown during continued, repeated use (column 3 lines 18-20).

With regard to Claims 5-6, Johnson discloses the polymeric compound, polyethylene glycol, having an average molecular weight from about 200 to about 6,000 (column 6 lines 20-21) and wherein the content of the polyethylene glycol is 0.065 to about 0.0001% by weight in the electrolytic solution (column 6 lines 3-6). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a polymeric compound, such as polyethylene glycol, having a specific average molecular weight and weight % with the electrolytic solution of Kamisuki et al., because Johnson teaches if quantities of the polyglycol fall below determined molecular weights and weight percents, the electrolyte will have undesired thixotropic characteristics and will not be adequately stabilized so that it will not undesirably tend to crack or shrink and breakdown in response to physical forces, and if quantities are in excess, there will be an uneconomic use of material which may result in an undesired increase in battery internal resistance (column 5 lines 56-67).

With regard to Claim 7, Johnson discloses a battery using an electrolytic solution containing a proton source of sulfuric acid and a polymer of polyethylene glycol, which

work in conjunction with the active materials of the electrodes associated with battery performance and charge/discharge of cycle life (column 4 lines 20-29). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use the proton source and polymer in conjunction with the active material of the electrodes of Kamisuki et al., because Johnson teaches batteries with these specific ingredients being utilized for prolonged periods of time without cracking or shrinking (column 8 lines 61-66).

With regard to Claim 17, Johnson discloses the content of the polymeric compound being between 0.065 and 0.0001 percent by weight of the electrolytic solution, but do not disclose wherein the content of polymeric compound is 0.1 to 30 percent by weight of the electrolytic solution. However, it would have been obvious to one of ordinary skill in the art to adjust the percent by weight of the polymeric compound as long as the mechanical strength requirements can be met. Discovery of optimum value of a result effective variable in known process is ordinarily within skill of the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to Claim 18, Kamisuki et al. disclose in Figure 3, a secondary battery comprising a cathode (2) containing a proton-conducting compound as an electrode active material, an anode (4) containing a proton-conducting compound as an electrode active material. Each electrode is made of a binder matrix wherein polymers are used as electrode active materials and are, for example, π-conjugated macromolecules such as polyanaline, polythiophene, polypyrrole, polyacetylene, poly-p-phenylene, polyphylene vinylene, polyperinaphthalene, polyfuran, polythienylene, polypyridinediyl,

among others (column 4 lines 25-40). Kamisuki et al. also discloses an aqueous electrolytic solution containing a proton source as an electrolyte, for example, an aqueous solution of protonic acid such as sulfuric acid, hydrochloric acid and phosphoric acid (column 5 lines 16-19).

Kamisuki et al. do not disclose wherein the electrolytic solution comprises a polymeric compound having an atom with an unpaired electron in its principal chain as an electron-transfer promoter.

Johnson discloses a gelled electrolyte solution containing a polyglycol polymer, preferably polyethylene glycol (column 3 line14-15), which has an oxygen atom with an unpaired electron as part of its chemical structure. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a polymeric compound having an atom with an unpaired electron in its principal chain with the electrolytic solution of Kamisuki et al., because Johnson teaches using an additive to stabilize the gel created and in an effort to improve the battery performance or life (column 4 lines 20-24).

6. Claims 1-7 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama et al. (US 6,300,015 B1) in view of Johnson (US 3,776,779).

With regard to Claim 1, Nishiyama et al. disclose in Figure 8, a proton conductive polymer battery comprising a cathode (2) containing a proton-conducting compound as an electrode active material, an anode (4) containing a proton-conducting compound as an electrode active material. A polymer is used for the positive and negative electrode

active materials and are selected from the group consisting of π-conjugated polymers such as polyanaline and derivatives thereof, polyindole and derivatives thereof (column 4 lines57-67), and the positive electrode active material also selected from a quinoid structure, polyanaline, polyindole, nitropolyanaline, polydiaminoanthraquinone, polypyrrole, polypyridine, polypyrimidine and derivatives thereof, anthraquinone derivatives and benzoquinone and derivatives (column 5 lines 2-18). Nishiyama et al. also disclose the gel electrolyte solution containing a proton source, such as sulfuric acid (column 5 lines 51-54), as an electrolyte.

Nishiyama et al. do not disclose wherein the electrolytic solution comprises a polymeric compound having an atom with an unpaired electron in its principal chain as an electron-transfer promoter.

Johnson discloses a gelled electrolyte solution containing a polyglycol polymer, preferably polyethylene glycol (column 3 line14-15), which has an oxygen atom with an unpaired electron as part of its chemical structure. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a polymeric compound having an atom with an unpaired electron in its principal chain with the electrolytic solution of Nishiyama et al., because Johnson teaches using an additive to stabilize the gel created and in an effort to improve the battery performance or life (column 4 lines 20-24).

With regard to Claims 2-4, Johnson discloses the electron-transfer promoter being a polymeric compound, preferably polyethylene glycol (column 3 lines 14-15), which in the principal chain, has an oxygen as an atom with an unpaired electron, and is

a polymeric compound having an alkylene oxide moiety in a repeating unit. Polyethylene glycol and polyethylene oxide are polymers having an identical structure: $HO-(CH_2-CH_2-O)_n-H$. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a polymeric compound, such as polyethylene glycol, having an atom with an unpaired electron in its principal chain with the electrolytic solution of Nishiyama et al., because Johnson teaches using an additive of such a nature that it will not significantly shrink, crack or otherwise breakdown during continued, repeated use (column 3 lines 18-20).

With regard to Claims 5-6, Johnson discloses the polymeric compound, polyethylene glycol, having an average molecular weight from about 200 to about 6,000 (column 6 lines 20-21) and wherein the content of the polyethylene glycol is 0.065 to about 0.0001% by weight in the electrolytic solution (column 6 lines 3-6). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a polymeric compound, such as polyethylene glycol, having a specific average molecular weight and weight % with the electrolytic solution of Nishiyama et al., because Johnson teaches if quantities of the polyglycol fall below determined molecular weights and weight percents, the electrolyte will have undesired thixotropic characteristics and will not be adequately stabilized so that it will not undesirably tend to crack or shrink and breakdown in response to physical forces, and if quantities are in excess, there will be an uneconomic use of material which may result in an undesired increase in battery internal resistance (column 5 lines 56-67).

With regard to Claim 7, Johnson discloses a battery using an electrolytic solution containing a proton source of sulfuric acid and a polymer of polyethylene glycol, which work in conjunction with the active materials of the electrodes associated with battery performance and charge/discharge of cycle life (column 4 lines 20-29). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use the proton source and polymer in conjunction with the active material of the electrodes of Nishiyama et al., because Johnson teaches batteries with these specific ingredients being utilized for prolonged periods of time without cracking or shrinking (column 8 lines 61-66).

With regard to Claim 17, Johnson discloses the content of the polymeric compound being between 0.065 and 0.0001 percent by weight of the electrolytic solution, but do not disclose wherein the content of polymeric compound is 0.1 to 30 percent by weight of the electrolytic solution. However, it would have been obvious to one of ordinary skill in the art to adjust the percent by weight of the polymeric compound as long as the mechanical strength requirements can be met. Discovery of optimum value of a result effective variable in known process is ordinarily within skill of the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

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as polyanaline, polythiophene, polypyrrole, polyacetylene, poly-p-phenylene, polyphylene vinylene, polyperinaphthalene, polyfuran, polythienylene, polypyridinediyl, among others (column 4 lines 25-40). Kamisuki et al. also discloses an aqueous electrolytic solution containing a proton source as an electrolyte, for example, an aqueous solution of protonic acid such as sulfuric acid, hydrochloric acid and phosphoric acid (column 5 lines 16-19).

Kamisuki et al. do not disclose wherein the electrolytic solution comprises a polymeric compound having an atom with an unpaired electron in its principal chain as an electron-transfer promoter.

Johnson discloses a gelled electrolyte solution containing a polyglycol polymer, preferably polyethylene glycol (column 3 line14-15), which has an oxygen atom with an unpaired electron as part of its chemical structure. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a polymeric compound having an atom with an unpaired electron in its principal chain with the electrolytic solution of Kamisuki et al., because Johnson teaches using an additive to stabilize the gel created and in an effort to improve the battery performance or life (column 4 lines 20-24).

Response to Arguments

7. Applicant's arguments filed May 18, 2007, have been fully considered but they are not persuasive.

8. Applicant's principal arguments are:

(a) Applicant asserts that the additive to stabilize the gel in Johnson, is not a polymeric compound having an atom with an unpaired electron in its principal chain. Applicant also states that the electrolyte of Johnson is a sulfuric acid electrolyte gelled with silica, which is chemically different from a proton-transfer type electrochemical cell wherein the polymeric compound functions as an electron-transfer promoter, and the reasons to use a polyglycol polymer in Johnson are unrelated to the electrochemical cell recited in Claim 1.

(b) Applicant asserts that the present invention demonstrates unexpected results or surprising effects of significant improvement in the capacity and cycle life of the battery due to the electron-transfer promoter, shown in Table 1 on page 19 of the specification.

In response to Applicant's arguments, please consider the following comments:

(a) Johnson teaches that the polyglycol polymer is used as an additive to stabilize the gel created as a result of the use of silica so that the gel is solid-like in character and is of such a nature that it will not shrink or crack or breakdown during continued, repeated use. However, mere recognition of latent properties, the polymer functioning as an electron-transfer promoter, in the prior art does not render non-obvious an otherwise known invention. *In re Wiseman,* 596 F.2d 1019, 201 USPQ 658 (CCPA 1979).

(b) The instant disclosure teaches the electron-transfer promoter as the polymeric compound polyethylene glycol. However, the Applicant has not established the differences in results that are in fact unexpected and

unobvious and of both statistical and practical significance over the prior art. Table 1 lists properties of polyethylene glycol as an electron-transfer promoter having different average molecular weights and content. The comparative example, not using the polyethylene glycol as an electron-transfer promoter, exhibits a capacity and cycle life that is very close to the capacity of examples 1-7, mostly closely resembling example 7, which has differing results that are within a small margin. The burden is on Applicant to establish results that are unexpected and significant. See MPEP 716.02(a) and (b).

Conclusion

9. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571) 272-

8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karie O'Neill
Examiner
Art Unit 1745

KAO

DAH-WEI YUAN
PRIMARY EXAMINER